Introduction

This report summarizes the results of a Phase I/II Cultural Resource Survey undertaken in 1993 for the Delaware Department of Transportation (DelDOT). The overall project involved the investigation of areas to be affected by proposed improvements to Valley Road (C.R. 294) between Route 7 (Limestone Road) and Route 41 (Old Lancaster Pike). Proposed road improvements include upgrading the road along its present alignment by creating twelve-foot travel lanes, ten-foot shoulders, drainage features, and stormwater management areas.

The archaeological services were performed pursuant to the instructions and intents set forth by Section 101(b)(4) of the National Environmental Policy Act 1969; Section 1(3) and 2(b) of Executive Order 11593; Section 106 of the National Historic Preservation Act of 1966; 23 CFR 771, as amended October 30, 1980; 36 CFR 66; the guidelines developed by the Advisory Council on Historic Preservation, published November 26, 1980; and the amended Procedures for the Protection of Historic and Cultural Properties as set forth in 36 CFR Part 800 (October 1, 1986).

This report was written by R. Alan Mounier, based upon information gathered by himself and others. Ann R. Brown compiled information from historical sources and assisted with graphics. Fieldwork was conducted by John H. ("Jack") Cresson and Debra Campagnari Martin, directed and assisted by the author.

Research Design

The purpose of this investigation is to identify and evaluate any cultural remains that might reside along the project alignment. As a preliminary investigation, this study has no particular research objectives respecting anthropological theory. Rather, the objectives are principally practical, having

Figure 1: Location Map
U.S.G.S. Kennett Square, PA Quadrangle

Scale - 1:24000

2000 feet

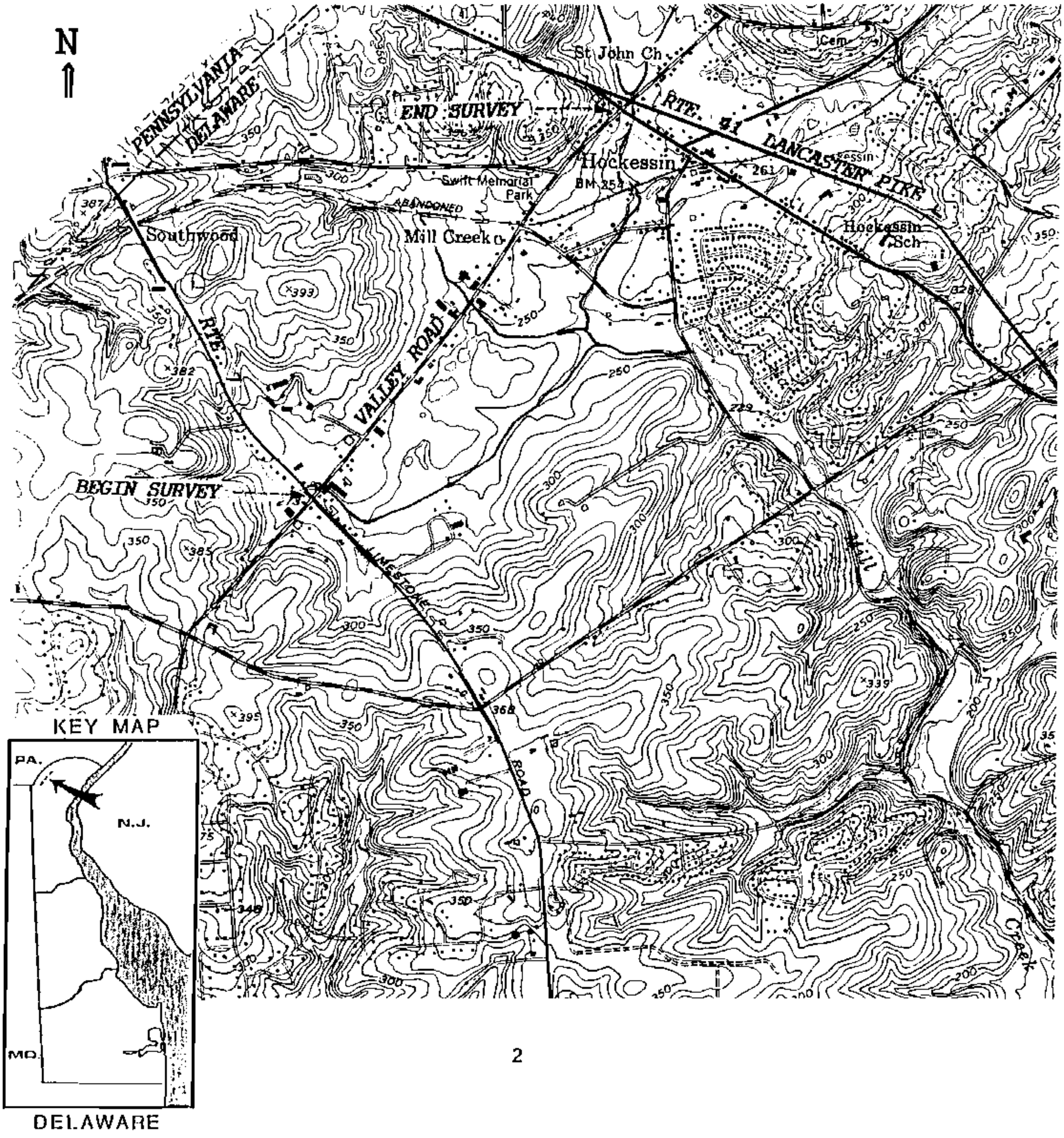


Figure 2: Historical Map, 1893

From Baist, 1893

Original Scale: 1-3/4 inch per mile

Scale - 1:38182

3000 feet

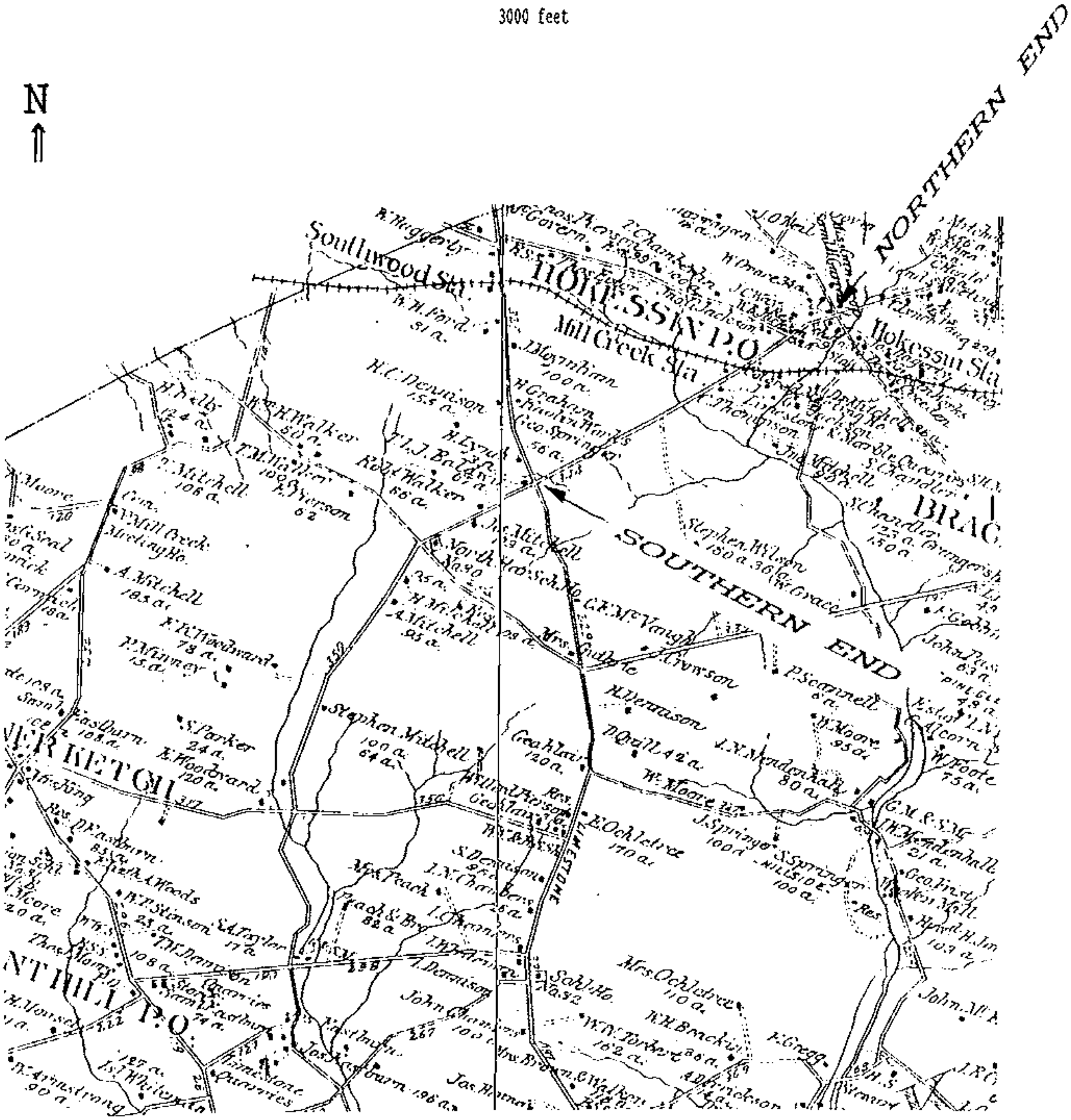
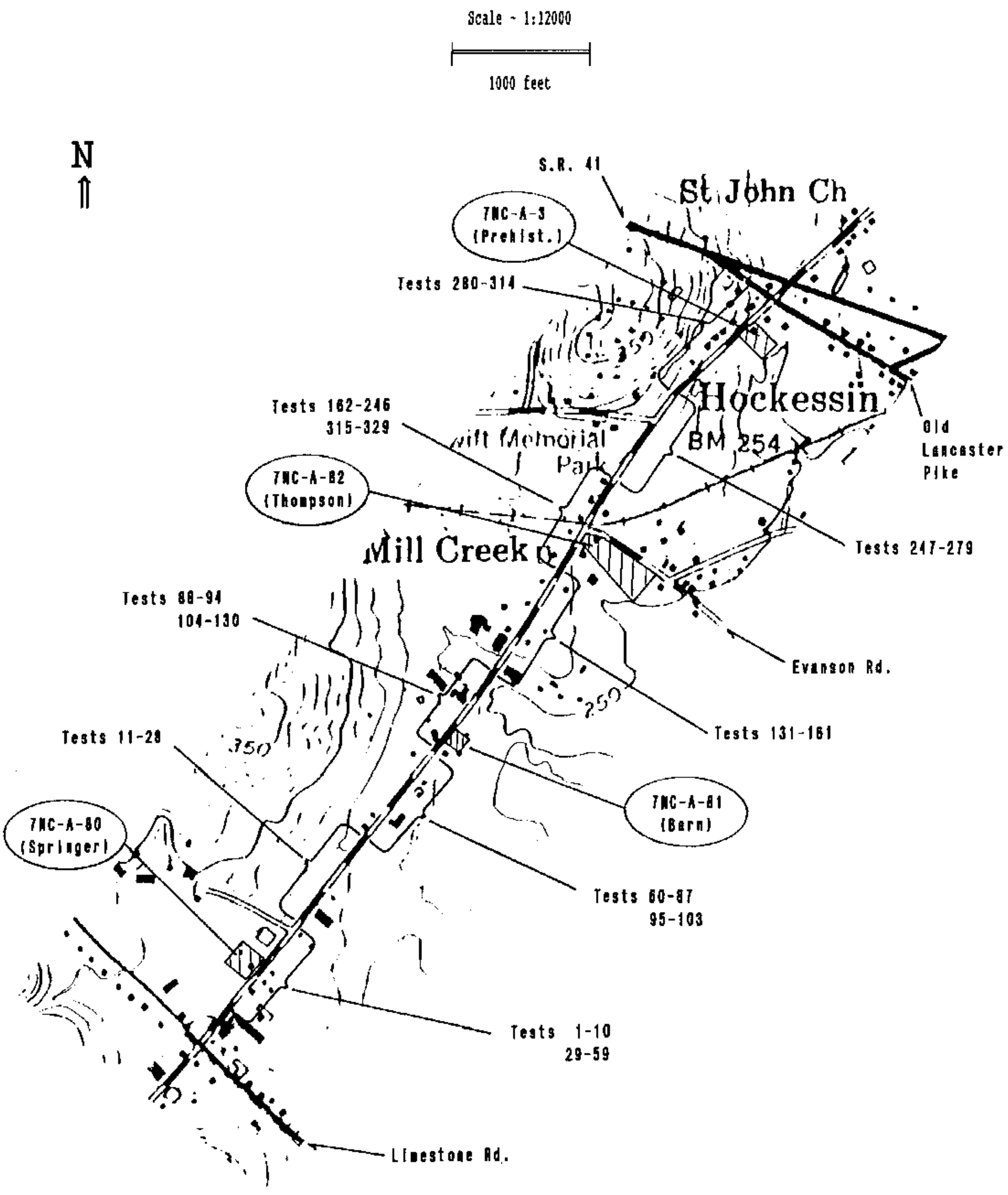


Figure 3: General Test and Site Locations



to do with the need to recognize cultural remains, if present, and to evaluate their significance so as to effectuate responsible management in the context of the current regulatory milieu.

The requirement for identification entails background research and fieldwork to determine the presence or absence of cultural remains. A prevailing sense of pragmatism compels the utilization of the most parsimonious research procedures consistent with the satisfaction of the stated survey objectives. The author recognizes that sites of human occupation vary in their composition and form with respect to their distribution in space, time, and culture. Given the expectation that evidence of human occupation is likely to occur unevenly across the landscape, the strategy for prospecting must suit the geographic configuration of the project location. The investigator generally favors the stratification of project locations -- especially those of substantial acreage -- into search zones on the basis of geomorphic considerations, particularly patterns of topography and drainage. As a rule, strict interval testing is avoided, except under conditions that might make such testing both productive and cost-effective. Usually, these conditions are satisfied only on project locations that are both limited in size and essentially planar in topography.

The investigative procedures and pertinent sources of information relating to the present study are described in more detail below (see Research Methods).

Upon detection of a cultural presence, the evaluation requirement necessitates differentiation between *cultural remains* and *cultural resources.* Whereas cultural remains comprise any physical vestiges of previous human behavior, cultural resources can be defined as those remains which have potential significance for science and/or for the appreciation of heritage. In this context, significance will be measured in relation to the National Register Criteria for Evaluation (36 CFR Part 60.4).

Research Methods

Research procedures included documentary research, fieldwork, laboratory procedures, and reporting. Each of these tasks will be described below.

1) Documentary Research

Documentary research was undertaken to gather basic data with respect to the natural and cultural histories of the project area, using the National Register Eligibility Study completed by Kise Franks and Straw (Jan. 16, 1991) as a general guide. Sources of information minimally included the following: County and local historical societies; Morris Library; Bureau of Archaeology and Historic Preservation; County Clerk's Office; and other institutional sources as necessary. Persons knowledgeable about local archaeology and history were sought out and interviewed.

2) Fieldwork

Fieldwork was undertaken to inspect the locations of known sites and to examine areas in which no sites have been as yet reported. Fieldwork comprised a comprehensive pedestrian survey -- including visual examination of exposed ground surfaces, earth cuts, standing structures, and ruins -- and subsurface testing.

Subsurface testing was conducted at appropriate intervals with opposable posthole shovels. Excavation units were opened in areas where potentially significant remains were found. Excavation Units measured 2½ x 5 feet (12½ s.f.), and were excavated in arbitrary three-inch levels or by cultural stratum, if present.

The sampling scheme for the Phase I study provided for close interval testing (50-foot) of the entire impact area, due to the moderate to high probability of encountering both prehistoric and historic remains. The impact area was defined as that area between the current edge of pavement and "R/W" (Right-of-Way) or "TCE" (temporary construction easement) lines, as drawn on project plans (dated August 1992, and January 18, 1993). When both lines were present, the outermost boundary line was considered to be definitive.

Roadside survey was accomplished in a single transect of 50-foot interval tests where the width of the impact area was 50 feet or less; or, in two transects of 50-foot interval tests where the impact area was wider than 50 feet. Large areas, planned for drainage features, were tested at a rate of 17 tests per acre (50-foot intervals).

A number of tests were held in reserve to be used in areas determined, through documentary research, to be archaeologically sensitive. When appropriate, these tests were excavated in addition to the regular testing proposed. A total of 329 test units were opened (Appendix I).

The Phase II portion of the proposal assumed that a maximum of five sites would require investigation following the Phase I work. The proposal provided for 15 additional posthole shovel tests, and up to two five-foot square excavation units (or four 2½ x 5 foot trenches) per site.

Excavated material was screened through No. 4 hardware cloth (¼" mesh). Cultural material was bagged appropriately by provenience and transported to the laboratory for processing.

Field data were recorded systematically at the time of observation, using a standardized record form. Measurements and estimates of size with respect to structures were recorded in English units. A photographic record was compiled.

3) Laboratory

All recovered materials deemed to have value in imputing significance to identified sites were cleaned and conserved as necessary. Processing and analysis of recovered remains followed current professional standards. Mundane, modern, and nondescript artifacts were culled from the assemblage without record.

Artifacts retained for analysis were packed in cardboard boxes, appropriately labelled as to provenience, and transmitted to a State repository for storage and future reference.

4) Reporting

Reporting follows established conventions for professional archaeological survey reports. The report of contains the following: introductory material; a description and rationale of research procedures; sources of information; an inventory and evaluation of cultural resources; and recommendations concerning the management of identified cultural resources.

Geographic Setting

Valley Road is located near Hockessin, within Mill Creek Hundred in northern New Castle County, Delaware. The northern portion of Delaware lies upon the Piedmont physiographic zone whose seaward boundary is located along the fall-line to the south, roughly parallel to Delaware Route 2, the Kirkwood Highway (DeCunzo, Catts, Grettler, Guerrant, and Fithian 1992:3). Further inland, the

Piedmont continues to rise in elevation until it becomes the Valley-and-Ridge system of the lower Allegheny Mountains.

The Piedmont is mostly hilly, with more gentle slopes near the fall line. Elevations range from about 100 to 400 feet above sea level. The geology consists of igneous and metamorphic rock. Most soils of the Piedmont are well-drained by way of stream drainages that flow eastward into the Delaware River (Matthews and Lavoie 1970:92).

However, along Valley Road the physiography differs from the general pattern in that approximately 2/3 of the soils are moderately to poorly drained. These soils, classed as part of the Glenville series, occur in depressions and around the heads of drainages (Matthews and Lavoie 1970:23). This soil tends to stay wet in the spring with only a moderate availability of moisture the rest of the year due to the presence of an impervious hardpan (technically termed a fragipan).

Mapped soil types within the project area include the Glenelg and Manor soils, 3-8% slope moderately eroded, Glenville silt loams 0-3 % slope slightly susceptible to erosion, Chester loam 0-3% slope well drained, and Hatboro silt loam (Matthews and Lavoie 1970:14-15, 22-25 and sheet 5). The latter soil occurs only in the uplands in depressions and at the bases of slopes. This alluvial soil sometimes overlies an older dark soil that was the original surface layer. The Hatboro soils are among the most poorly drained soils of the county (Matthews and Lavoie 1970:24-25)

The project area is located along the headwaters of Mill Creek at approximately 200 feet above sea level. Old maps show four small drainages crossed by Valley Road. These are all unnamed tributaries of Mill Creek, which flows southeasterly into the Delaware River.

Native vegetation in the area consisted of mostly mixed hardwoods including oak, tulip-poplar, and maples (Matthews and Lavoie 1970:14-15, 23,24). In the more poorly drained soils, water tolerant hardwoods such as willow, alder, and gum trees are present (Matthews and Lavoie 1970:24-25). This sort of environment is suitable for both open and woodland wildlife, in drier locations, and for woodland and wetland wildlife in less well drained areas (Matthews and Lavoie 1970:54-55). Essentially modern conditions have prevailed at least for the last three thousand years. However, following the arrival of Europeans in the 17th century, the original aspect of the landscape has been vastly altered by deforestation, farming, mining, and other developments. Photographs on the following pages illustrate present conditions.

Paleo-Geography

Details of paleoenvironmental conditions in the immediate project area have not been examined in great depth, but reference to the synthesis of paleoenvironmental data developed by Carbone (1976, 1982) and others (Sirkin 1977; Kraft 1977; Kraft and John 1978; Hartzog 1982; Custer 1989) for other portions of the Middle Atlantic region provide a *general* basis for discussion of environmental changes over the past few thousand years in northern Delaware. These studies have been used elsewhere in the interpretation of archaeological situations in the Delaware Valley (e.g., Custer 1978). Pollen cores from the Mitchell Farm site (7NC-A-2), within a mile of the project location, provide valuable insight into ancient geographic conditions in the locale (Custer 1984). In the absence of other well established and scientifically defensible *local* paleoenvironmental record, any conclusions based upon extrapolated data must be regarded as tentative.

Figure 4: Photograph Location Map

U.S.G.S. Kennett Square, PA Quadrangle

Scale - 1:12000

1000 feet

N

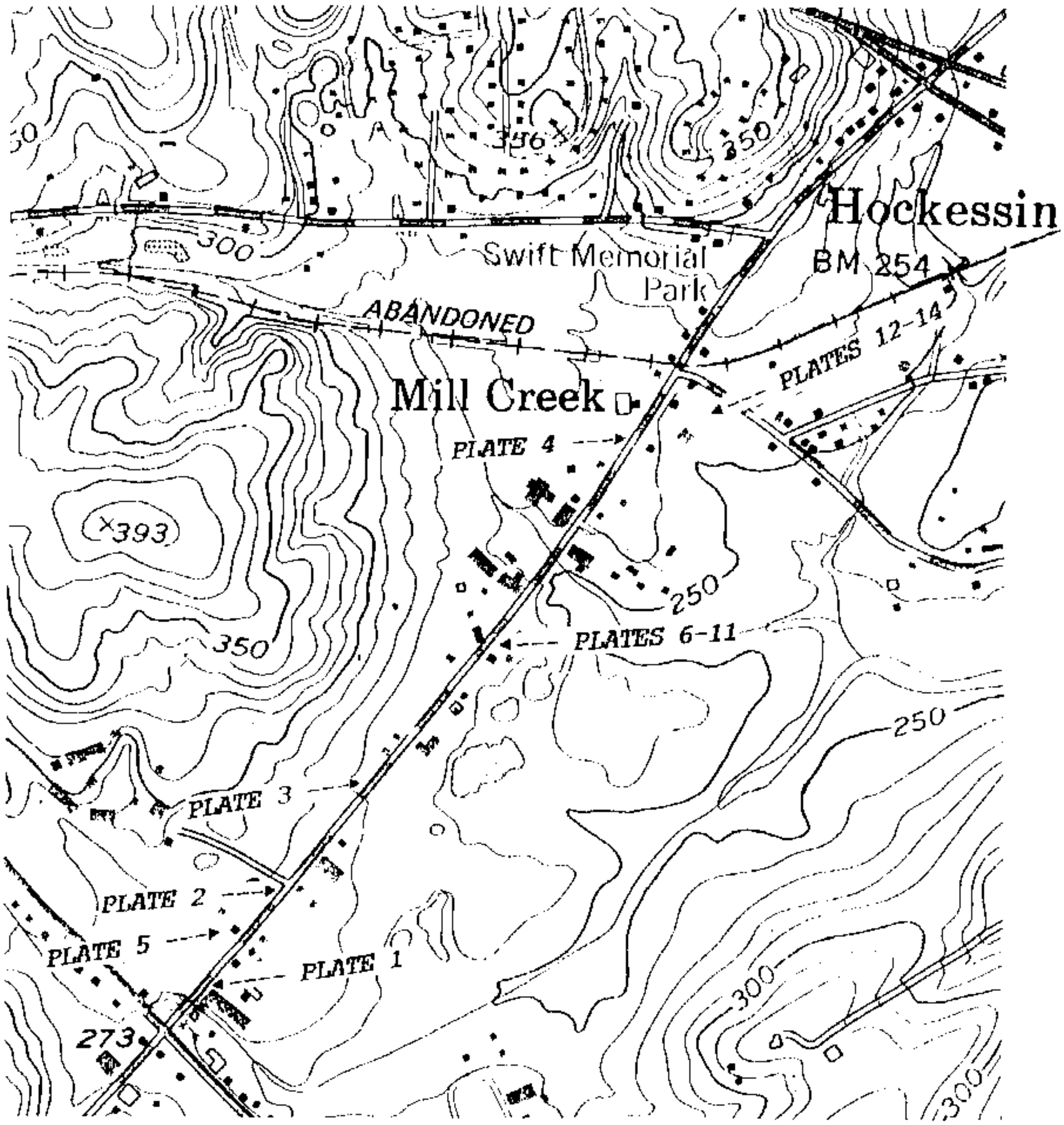


Plate 1: General View of Valley Road

Looking Southwest toward Limestone Road

Plate 2: General View of Valley Road

Looking Northeast

Plate 3: General View of Valley Road

Looking Northeast

Plate 4: General View of Valley Road

Looking Northeast

Based upon extrapolated pollen data, certain Mid-Atlantic archaeologists have related perceived changes in archaeological settlement patterns to episodic climatic factors, the principal of these being post-glacial warming and a subsequent period of inferred moisture stress which is referred to as the "xerothermic" (Carbone 1976, 1982; Custer 1978, 1984, 1989; Curry 1980). These episodes correlate roughly with the appearance of Paleo-Indian and Early Archaic cultures (13,000-6,000 B.C.) on the one hand and Late Archaic Cultures on the other (5,000-3,000 B.C.). Rates in the rise of sea levels in post-Pleistocene times, the stabilization of shorelines and of estuaries are also seen as critical factors affecting human settlement (Salwen 1962; Braun 1974; Custer 1978, 1984, 1987, 1989; Catlin et al. 1982; Thorbahn and Cox 1988).

Some interpretations of paleoenvironmental conditions in the Middle Atlantic region have not received universal acclaim in the archaeological community because of potential flaws in the paleoenvironmental data or the manner in which they have been collected or applied. As Arthur Joyce (1984, 1988) and John Cavallo (1987; Cavallo and Joyce 1985) have pointed out, there are inconsistencies in the inferred chronology of the xerothermic and with the data, chiefly palynological, by means of which it has been interpreted. Particularly troubling is recourse to insecurely dated, or undated, pollen cores which leads to a rather broad, inferred chronological range for the xerothermic as well as problematical reconstructions of presumably related floral (and associated faunal) communities. In addition, the very interpretation of pollen data as reflecting principally, or solely, upon past climatic conditions has been called into question (Joyce 1984; McWeeney 1984, 1990, 1990a). Finally, climatic inferences based upon geomorphological and sedimentological data (Custer 1978; Curry 1980; Curry and Custer 1982; Stewart 1985; Curry and Ebright 1989) must be viewed with caution because of the complexities associated with local erosional and depositional events (Gladfelter 1985; Cavallo, personal communication 1986, 1987).

The following paragraphs present a summary of paleoenvironmental development in the region during late glacial and post-glacial times. Around 18,000 years ago, the Wisconsin glaciation reached its maximum southern extent in the Middle Atlantic region near the 41st parallel (Wolfe 1977), about 110 miles north of the present project location. The retreat of the Late Wisconsin ice sheet began in the vicinity of Kittatinny Mountain (in extreme northern N.J. at latitude 41°20') approximately 15,000 years ago (Crowl and Stuckenrath 1977). Based upon palynological data, a cold period associated with this glaciation persisted in the Middle Atlantic region until 13,000 years ago. Even unglaciated terrain had a "periglacial" environment characterized by a cold climate with temperatures below freezing most of the year. The ground contained "permafrost," a zone of ground permanently frozen except for a shallow layer near the surface where temporary thawing might occur during warm seasons. Pollen cores from various bogs in the region indicate the presence of jack-pine, spruce, as well as tundra shrubs and herbs. By 12,400 years ago, spruce forests succeeded tundra vegetation. Pine becomes dominant in pollen cores between 11,000 and 7,000 years ago, after which oak forests prevail throughout the region (Sirkin 1977). This condition is reflected in the pollen from the Mitchell Farm Site (7NC-A-2) near Hockessin, where levels containing pine and non-arboreal pollen have been dated to 9,530 B.C.(Custer 1984:34). The amelioration of climate in post-glacial times permitted the presence of human occupation in the Upper Delaware Valley by 10,600 years ago (Crowl and Stuckenrath 1977). A cluster of Paleo-Indian finds at the

Mitchell Farm site and elsewhere in northwestern New Castle County, Delaware may be assumed to have a similar antiquity.

In late glacial times, the topography and hydrology of the region was much different than at present. Interior of the water courses the land contained many small ponds or waterholes resulting from the melting of ground ice and subterranean ice wedges in the permafrost (Wolfe 1977). These features, which survive as relict wet depressions, are known as thermo-karst basins or frost-thaw basins (Wolfe 1977). In New Jersey, archaeologists refer to these features as "pingoes" or "palsas," depending on the form and inferred geological origins (Bonfiglio and Cresson 1982). From Paleo-Indian to Late Archaic times, these basins were a focal point for human occupation, presumably as hunting places. In Delaware, basins of similar, if not identical form are commonly called "bay-basins" (Custer 1986). There are no such geomorphic features in this project area.

About 12,000 years ago sea level stood approximately 25.5 meters (84 feet) below present. Because of glacial melting, sea level had risen to approximately 14 meters (46 feet) below its present level by 7,500 Years ago (Kraft 1977; Kraft and John 1978). The subsidence of the land relative to sea level continues at a rate of approximately 1.5 meters (5 feet) per millennium (Wolfe 1977).

This subsidence has resulted in the flooding of ancient land surfaces and waterways. The ancient valley of the Delaware River was narrower and much more deeply incised than at present. Kraft and John (1978) present a paleogeographic reconstruction of the Lower Delaware River and Bay based upon geological cores, pollen analysis, and radiocarbon dating. Of particular interest are their findings with respect to geological cores taken near Holly Oak, Delaware. These cores show a partially filled tide marsh that rises about 2 meters (6.6 feet) above mean low sea level. The base of this marsh rests unconformably on fluvial sediments at an elevation about 1.5 meters (4.9 feet) below sea level. Organic matter in the marsh sediments have been dated by the radiocarbon technique to the third millennium before the present (690 to 455 B.C.). The underlying fluvial deposits have been dated by the same technique to a period in excess of 40,000 years old.

The paleogeographic reconstruction for Holly Oak at ca. 6,000 Years ago depicts the Delaware River with a maximum width of 500 meters (1640 feet) (Kraft and John 1978: Fig. 7). A narrow band of tidal marsh separated the river from the adjoining uplands. This reconstruction reflects conditions during Middle Archaic times. Given the available information, one can reasonably infer that the river was substantially narrower in Paleo-Indian and Early Archaic times, with the left bank of the ancient Delaware standing in or near what is now the ship channel. These reconstructions imply that major settlements of ancient populations along the Delaware River have been inundated by rising water levels, and probably lost to erosion and dredging in historic times.

As nearly as can be determined with the limited data now in hand, the local climate and landforms as well as flora and fauna had begun to approximate their present configurations by Archaic times [c.7000 years ago] (Salwen 1975; Sirkin 1977; Kraft 1977), though new evidence suggests that vegetation very similar to modern communities may have been present as early as 10,000 years ago (McWeeney 1990). At the Mitchell Farm site (7NC-A-2) pollen of oak and hemlock has an associated carbon date of 5840 B.C. Late pollen profiles at that site show an increase in hickory and non-arboreal pollen (Custer 1984:35). By Late Woodland times an essentially modern environment had emerged (Custer 1984; 1989). Throughout the period described by human habitation in the region vegetative and wildlife communities can be expected to have varied somewhat in composition and distribution in response to changes in environmental conditions, including the pressures exerted upon them by aboriginal population. Some of the conjectured shifts in ecological relationships would have, in turn, resulted in changing adaptations by resident human populations. Further treatment of this topic can be found in the following discussion of regional archaeology.

Archaeology

Currently recognized prehistoric sites in the Mid-Atlantic region represent a broad range of cultural expressions ranging from Paleo-Indian occupations (with an antiquity of perhaps 20,000 years) to those of the Late Woodland Period (which ends with European incursions in the 17th century). Intervening cultures including Archaic (comprising Early, Middle and Late phases) and Woodland (also comprising Early, Middle and Late expressions) are in evidence.

Throughout the region the traditional cultural-temporal sequence has been described, with variations, as follows: Paleo-Indian (12,000 B.C.- 7000 B.C.); Early Archaic (7000 B.C.- 6000 B.C.); Middle Archaic (6000 B.C.- 4000 B.C.); Late Archaic (4000 B.C. - 2000 B.C.); Terminal Archaic or Transitional (2000 B.C.- 1000 B.C.); Early Woodland (1000 B.C.- 500 B.C.); Middle Woodland (500 B.C. - A.D. 1000); and Late Woodland (A.D. 1000 - A.D. 1600). Because the physical traits and underlying cultural behaviors that archaeologists use to discriminate between cultural-temporal units frequently show continuities as well as distinctions, a variety of classificatory schemes have been developed over time. In addition, estimations of age for archaeological cultures continue to be refined. Since each cultural-temporal classification is an heuristic construct,